

All District Engineers

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Special Provision for Superpave Bituminous Concrete Mixture
IL-4.75

July 23, 2004

This special provision was developed by the Bureau of Materials and Physical Research.

This special provision should be inserted into all contracts using Superpave bituminous concrete mixture IL-4.75 and should be used in conjunction with the special provision, "Quality Control/Quality Assurance of Bituminous Concrete Mixtures"

The districts should include the BDE Check Sheet marked with the applicable special provisions for the November 5, 2004 and subsequent lettings. The Project Development and Implementation Section will include a copy in the contract.

This special provision will be available on the transfer directory July 23, 2004.

80136m

SUPERPAVE BITUMINOUS CONCRETE MIXTURE IL-4.75 (BDE)

Effective: November 1, 2004

Description. This work shall consist of constructing bituminous concrete surface course or leveling binder with a Superpave, IL-4.75 mixture. Work shall be according to Section 406 of the Standard Specifications and the special provision "Quality Control/Quality Assurance of Bituminous Concrete Mixtures", except as modified herein.

Materials.

- (a) Fine Aggregate. The fine aggregate shall be at least 50 percent manufactured sand meeting FA 20 gradation. The manufactured sand shall be stone sand, slag sand, steel slag sand, or combinations thereof. When used as leveling binder, steel slag sand will not be permitted.

The fine aggregate quality shall be Class B. The total minus 75 μm (No. 200) material in the mixture shall be free from organic impurities.

- (b) Reclaimed Asphalt Pavement (RAP). RAP will not be permitted.
- (c) Bituminous Material. The asphalt cement (AC) shall conform to Article 1009.05 of the Standard Specifications for SBS PG76-28 or SBR PG76-28, except the elastic recovery shall be a minimum of 80.

The AC shall be shipped, maintained, and stored at the mix plant according to the manufacturer's requirements. It shall be placed in an empty tank and not blended with other asphalt cements.

- (d) Mineral Filler. Mineral filler shall conform to the requirements of Article 1011.01 of the Standard Specifications, except it shall not be collected dust.

Laboratory Equipment.

- (a) Superpave Gyratory Compactor. The Superpave gyratory compactor (SGC) shall be used for all laboratory mixture compaction.
- (b) Ignition Oven. The ignition oven shall be used for determination of AC content. The ignition oven shall also be used to recover aggregates for all required washed gradations.

The Engineer may waive the ignition oven requirement for AC content if the aggregates to be used are known to have ignition AC content calibration factors, which exceed 1.5 percent. If the calibration factor exceeds 1.5 percent other IDOT approved methods shall be utilized for determination of AC content.

Mixture Design. The Contractor shall submit mix designs for approval, for each required mixture. Mix designs shall be developed by Level III personnel who have successfully completed the course, "Superpave Mix Design Upgrade". Articles 406.10 and 406.13 of the Standard Specifications shall not apply. The mixtures shall be designed according to the respective Illinois Modified AASHTO references listed below.

AASHTO MP 2	Standard Specification for Superpave Volumetric Mix Design
AASHTO PP 2	Standard Practice for Short and Long Term Aging of Hot Mix Asphalt (HMA)
AASHTO PP 19	Standard Practice for Volumetric Analysis of Compacted Hot Mix Asphalt (HMA)
AASHTO PP 28	Standard Practice for Designing Superpave HMA
AASHTO T 209	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
AASHTO T 305	Standard Method of Test for Determination of Draindown Characteristics in Uncompacted Asphalt Mixtures.
AASHTO T 308	Determining the Asphalt Content of Hot Mix Asphalt (HMA) by the Ignition Method
AASHTO T 312	Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor

(a) Mixture Composition. The job mix formula (JMF) shall conform to the following:

Sieve	Percent Passing
12.5 mm (1/2 in.)	100
9.5 mm (3/8 in.)	100
4.75 mm (No. 4)	90-100
2.36 mm (No. 8)	70-90
1.18 mm (No. 16)	50-65
600 μ m (No. 30)	35-55
300 μ m (No. 50)	15-30
150 μ m (No. 100)	10-18
75 μ m (No. 200)	8-10
AC Content	8% to 10%

(b) Volumetric Requirements.

Volumetric Parameter	Requirement
Design Air Voids	2.5 % at Ndesign 50
Voids in the Mineral Aggregate (VMA)	19.0% minimum
Voids Filled with Asphalt (VFA)	87-95%
Maximum Draindown	0.3%

- (c) Determination of Need for Anti-Stripping Additive. The mixture designer shall determine if an additive is needed in the mix to prevent stripping. The determination shall be made on the basis of tests performed according to Illinois Modified T 283. To be considered acceptable by the Engineer as a mixture not susceptible to stripping, the ratio of conditioned to unconditioned split tensile strengths (TSRs) shall be equal to or greater than 0.75 for 4 in. specimens or 0.85 for 6 in. specimens. Mixtures having TSRs less than these, either with or without an additive, will be considered unacceptable.

When it is determined that an additive is required, the additive may be hydrated lime, slaked quicklime, or a liquid additive, at the Contractor's option. The liquid additive shall be selected from the Department's list of approved additives and may be limited to those, which have exhibited satisfactory performance in similar mixes.

Dry hydrated lime shall be added at a rate of 1.0 to 1.5 percent by weight of total dry aggregate. Slurry shall be added in such quantity as to provide the required amount of hydrated lime solids by weight of total dry aggregate. The exact rate of application for all anti-stripping additives will be determined by the Engineer. The method of application shall be according to Article 406.12 of the Standard Specifications.

Mixture Production. Plant modifications may be required to accommodate the addition of higher percentages of mineral filler as required by the JMF.

During production, mineral filler shall not be stored in the same silo as collected dust. This may require the wasting of any previously collected baghouse fines prior to production of the IL-4.75 mixture. Only dust collected during the production of IL-4.75 may be returned directly to the IL-4.75 mixture. Any additional minus 75 μ m (No. 200) material needed to produce the IL-4.75 shall be mineral filler.

The mixture shall be produced within the temperature range recommended by the asphalt cement producer; but not less than 155 °C (310 °F).

The amount of moisture remaining in the finished mixture shall be less than 0.3 percent based on the weight of the test sample after drying.

Mixtures containing steel slag sand or aggregate having absorptions \geq 2.5 percent shall have a silo storage plus haul time of not less than 1.5 hours.

Control Charts/Limits. Control charts/limits and testing frequency shall be according to QC/QA requirements for Class I mixtures except as follows:

Parameter	Individual Test	Moving Average
% Passing		
1.18 mm (No. 16)	± 4%	± 3%
75 µm mm (No. 200)	± 1.0%	± 0.8%
Asphalt Content	± 0.2%	± 0.1%
Air Voids	± 1.0% (of design)	± 0.8% (of design)
Density	93.5 - 97.4%	

CONSTRUCTION REQUIREMENTS

Placement. The mixture shall be placed on a dry, clean surface when the air temperature in the shade is 10 °C (50 °F) or above. The mixture temperature shall be 155 °C (310 °F) or above and shall be measured in the truck just prior to placement.

When used as leveling binder, the mixture shall be overlayed within five days of being placed.

Lift Thickness.

- (a) Surface Course. The minimum and maximum compacted lift thickness for the IL-4.75 mixture shall be 19 mm (3/4 in.) and 32 mm (1 1/4 in.) respectively.
- (b) Leveling Binder. Density requirements for IL-4.75 mixture shall apply when the nominal , compacted thickness is 19 mm (3/4 in.) or greater.

Compaction. The compaction operation shall start immediately after the mixture has been placed. The Contractor shall provide a minimum of two steel-wheeled tandem rollers for breakdown (T_B) and one finish steel-wheeled roller (T_F) meeting the requirements of Article 406.16(a) and 1101.01(e) of the Standard Specifications except the minimum compression for all of the rollers shall be 49 N/mm (280 lb/in.) of roller width. Pneumatic-tired and vibratory rollers will not be permitted.

Basis of Payment. This work will be paid for at the contract unit price per metric ton (ton) for POLYMERIZED LEVELING BINDER (MACHINE METHOD), SUPERPAVE, IL-4.75, N50; and POLYMERIZED BITUMINOUS CONCRETE SURFACE COURSE, SUPERPAVE, IL-4.75, N50.